

Investigation of Complex Plutonium Oxalate Compounds by the Polarographic Method. 89-1-7/29

the polarographical data the constant for  $[\text{Pu}(\text{C}_2\text{O}_4)]^{-4}$  were determined as follows:

$$[\text{Pu}(\text{C}_2\text{O}_4)_3]^{-3} : K = 2,2 \cdot 10^{-11}$$

$$[\text{Pu}(\text{C}_2\text{O}_4)_4]^{-5} : K = 2,4 \cdot 10^{-12}$$

$$[\text{Pu}(\text{C}_2\text{O}_4)_4]^{-4} : K = 33 \cdot 10^{-28}$$

There are 4 figures, 6 tables, and 9 references, 1 of which is Slavic.

SUBMITTED: August 29, 1957.

AVAILABLE: Library of Congress.

Card 2/2

Fomin, V. V.

CHEMISTRY AND PHYSICAL CHEMISTRY OF REACTOR MATERIALS AND PROCESSES

"Study of Complex Oxalates of Plutonium by a Polarographic Method," by V. V. Fomin, S. P. Vorob'yev, and M. A. Andreyeva. Atomnaya Energiya, No 1, January 1958, pp 57-62.

A study of the composition and stability of complex ions of tri- and quadri-valent plutonium in oxalate solutions. If the potassium oxalate solutions have a pH of 3.5 to 6, the complexes  $Pu(C_2O_4)_4^{4-}$  (predominant quantity) and  $Pu(C_2O_4)_4^{5-}$  are formed. Under these conditions,  $Pu^{+4}$  gives a clearly-pronounced reversible reaction wave, suitable for quantitative polarographic determination of the plutonium. The oxidation-reduction potential of this reaction in one mole of potassium oxalate is 0.205 v. At a pH of 6 to 8, there simultaneously exist in the solutions two complexes of  $Pu^{+4}$ .

Bibliography of 9 titles.

Card: 1/1

APPROVED FOR RELEASE: 06/13/2000

CIA-RDP86-00513R000413510007-0

AUTHORS: Fomin, V. V., Mayorova, Ye. P.

TITLE: The Extraction of Nitrous Acid in 1 Molar-Benzene Solution of Tributylphosphate (Ekstraktsiya azotnoy kisloty 1 mol ras-tvorom tributilfosfata v benzole)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol. 3, Nr 2, pp.540-541 (USSR)

ABSTRACT: The extraction of  $HNO_3$  in 1 molar-benzene solution of tributylphosphate in  $HNO_3$ -concentrations higher than 3,5 Mol/l was investigated. For the distribution coefficients  $HNO_3$  the following equations are given:

$$\alpha = \frac{c_{or}}{c_v} = \frac{[HNO_3 \cdot TBP]_{or} + 2[(HNO_3)_2 \cdot TBP]_{or}}{(HNO_3)_v} - K_o [HNO_3]_v [TBP]_{or} + 2 K_o [HNO_3]_v^3 [TBP]_{or} \quad \text{and}$$

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78-2-42/43

The Extraction of Nitrous Acid in 1 Molar-Benzene Solution of Tributyl-phosphate

$$\alpha = \frac{K_o [HNO_3]_v (1 + 2 K [HNO_3]_v^2)}{1 + K_o [HNO_3]_v^2 + K_o K [HNO_3]_v^4}$$

K is calculated for  $K_o = 0,22$  and for the distribution coefficient = 0,19. Values of 0,002 were found for K. The found values for  $\alpha$  are in good agreement with the experimentally found values. E. g. for  $\alpha = 0,10$  experimentally  $\alpha = 0,10$  is found, for  $\alpha = 0,017 - \alpha = 0,16$ , for  $\alpha = 0,21 - \alpha = 0,23$ . There are 1 table, and 1 reference, which is Slavic.

SUBMITTED: June 17, 1957

AVAILABLE: Library of Congress

Card 2/2

AUTHORS: Mayorova, Ye. P., Fomin, V. V. SOV/78-3-8-35/48

TITLE: The Extraction of Thorium by Means of Tributylphosphate (Ekstraktsiya toriya tributilfosfatom) III. The Effect of  $\text{SO}_4^{2-}$  Ions on the Distribution of Thorium (III. Vliyaniye ionov  $\text{SO}_4^{2-}$  na raspredeleniye toriya)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol. 3, Nr 8, pp. 1937-1954 (USSR)

ABSTRACT: Experiments with  $\text{SO}_4^{2-}$  ions were carried out to determine the stability constant of thorium; these experiments supplied the distribution coefficients of thorium between the aqueous phase, containing the ions  $\text{H}^+$  and  $\text{NO}_3^-$ , and the solvent tributyl phosphate in benzene. The ionic force in the aqueous solution being in equilibrium is kept constant in all experiments (1,7). The experiments demonstrated that sulfuric acid is not extracted by tributyl phosphate. The experiments carried out to determine the distribution coefficient of thorium were carried out at the following ratios:

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SOV/78-3-8-35/48

The Extraction of Thorium by Means of Tributylphosphate. III. The Effect of  
 $\text{SO}_4^{2-}$  Ions on the Distribution of Thorium

$[\text{H}^+] = 0,3 \text{ mole/l}$ ,  $[\text{NO}_3^-] = 1,7 - 0,3 \text{ mole/l}$ ,  $[\text{HSO}_4^-] = 0,01 - 0,05 \text{ mole/l}$ .

The complex ions of thorium with two addenda contain only one  $\text{SO}_4^{2-}$  group and not more than three  $\text{NO}_3^-$  groups.

The stability constant of complex ions of the molecules

$\text{Th}(\text{SO}_4)^{2+}$ ,  $\text{Th}(\text{SO}_4)_2$ ,  $\text{Th}(\text{NO}_3) \cdot (\text{SO}_4)^+$ ,  $\text{Th}(\text{NO}_3)_2\text{SO}_4$  and  $\text{Th}(\text{NO}_3)_3\text{SO}_4^-$  were calculated and the following values were found: 200, 2500, 1950, 1100 and 500.

There are 10 figures, 14 tables, and 7 references, 2 of which are Soviet.

SUBMITTED: November 15, 1957

Card 2/2

SOV/78-3-9-2/38

AUTHORS: Fomin, V. V., Dmitriyeva, N. A., Reznikova, V. Ye.

TITLE: Preparation and Properties of Plutonium Halides (Polucheniye i svoystva galogenidov plutoniya) I. On Plutonium Chlorides (I. O khloridakh plutoniya)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol 3, Nr 9, pp 1999-2005 (USSR)

ABSTRACT: The chlorination of plutonium at increased  $\text{CCl}_4$  pressure was investigated. When chlorinating micro-quantities of thorium and plutonium, it was ascertained that the sublimation of the developed plutonium chloride in a  $\text{CCl}_4$  current at low temperature proceeds like that of thorium. In the chlorination of  $\text{UO}_2$  and  $\text{PuO}_2$  by carbon-tetrachloride vapors uranium dioxide at a temperature of  $350-450^\circ\text{C}$  is transformed into uranium tetrachloride. At about  $500^\circ\text{C}$  plutonium oxide is transformed into plutonium-III-chloride. The specific weight of  $\text{PuCl}_3$  is  $5.33 \text{ g/cm}^3$ . In the vaporization of hydrochloric solutions of plutonium-IV-

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SOV/78-3-9-2/38

.Preparation and Properties of Plutonium Halides. I. On Plutonium Chlorides

chloride at 70-100°C in the air, a compound is separated in which the ratio Pu : Cl is 2 : 3. In vacuum this compound separates water and oxygen. The possibilities of preparing plutonium-III-chloride by thermodynamical methods were discussed. In the chlorination of plutonium oxide in the presence of rubidium chloride a red-orange substance is formed. The adsorption spectrum of this compound indicates the presence of the Pu-IV-ion in solution. This experiment demonstrates that the preparation of complex chloride of tetravalent plutonium by the dry method is possible. There are 1 figure, 5 tables, and 12 references, 4 of which are Soviet.

SUBMITTED: April 11, 1958

Card 2/2

SOV/78-3-9-17/38

AUTHORS: Fomin, V. V., Mayorova, Ye. P., Krapivin, M. I., Yudina, V. G.

TITLE: The Extraction of Plutonium-(IV) With Tributyl Phosphate (Ekstraktsiya plutoniya (IV) tributilfosfatom) I. The Dependence of the Distribution Coefficient on the Concentration of Tributyl Phosphate (I. Zavisimost' koeffitsiyenta raspredeleniya ot kontsentratsii tributilfosfata)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol 3, Nr 9, pp 2113-2116 (USSR)

ABSTRACT: The dependence of the distribution coefficient in the extraction of plutonium-IV compounds with tributyl phosphate was investigated. In the calculation of the distribution coefficient the term "true distribution coefficient" was introduced. The distribution coefficient for n-experiments is given in the case of subsequent extractions taking into account the apparent and the true distribution coefficient by the equation (11):

$$\alpha^{(n)} = \frac{\alpha^0(1-p)}{(1-p)+p(\alpha^0+1)^2} \quad (11)$$

Card 1/2 The extraction of plutonium-IV compounds was carried out with a



SOV/78-3-9-17/38

The Extraction of Plutonium-(IV) With Tributyl Phosphate. I. The Dependence of the Distribution Coefficient on the Concentration of Tributyl Phosphate

1,5 mol solution of tributyl phosphate in benzene at 2,0 mol  $\text{HNO}_3$ . The true distribution coefficient of plutonium was calculated from the experimental results for the determination of the distribution coefficient of plutonium with concentrated tributyl phosphate. The not extracted residue was investigated with respect to the  $\alpha$ -radiation, and it was found that besides  $\text{Pu}^{239}$  also  $\text{Am}^{241}$  exists. There are 2 figures, 2 tables, and 2 references, 1 of which is Soviet.

SUBMITTED: August 3, 1957

Card 2/2

SOV/78-3-10-2/35

AUTHORS: Fomin, V. V., Reznikova, V. Ye., Zaytseva, L. L.

TITLE: The Production of Plutonium Tribromide and Some of Its Properties  
(Polucheniye i nekotoryye svoystva tribromida plutoniya)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol 3, Nr 10, pp 2231-2235  
(USSR)

ABSTRACT: The spectra of absorption of solid plutonium tribromide were taken at the temperature of liquid nitrogen. A method was described according to which plutonium tribromide can be produced by acting HBr on plutonium (IV)-oxalate at a temperature of 500°C. The specific weight of plutonium tribromide thus produced is  $5,54 \pm 0,02$ . The density of plutonium tribromide depends on the composition of the compounds which are treated with HBr. The values vary between  $5,0 \text{ g/cm}^3$  and  $5,8 \text{ g/cm}^3$ . The hygroscopic properties of plutonium tribromide were analyzed and it was found that the bromide does not show a perceptible moisture absorption after it has been kept over sulfuric acid for 7 hours. The existence of two crystal hydrates of  $\text{PuBr}_3$  was found and their spectra of absorption were taken. It was found that  $\text{PuBr}_3$

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• The Production of Plutonium Tribromide and Some of Its Properties

and its crystal-hydrate compounds decompose when  $\alpha$ -rays act on them. The decomposition of bromides by action of  $\alpha$ -radiation is observed by the appearance of bromine vapor over  $\text{PuBr}_3$ .

There are 3 figures, 1 table, and 5 references, 3 of which are Soviet.

SUBMITTED: April 14, 1958

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66396

SOV/58-59-10-23678

24,3430

Translation from: Referativnyy Zhurnal, Fizika, 1959, Nr 10, p 273 (USSR)

AUTHORS: Korovina, I.A., Lipis, L.V., Fomin, V.V.

TITLE: On the Ultraviolet Absorption Spectra of Plutonium Compounds

PERIODICAL: Fiz. sb. L'vovsk. un-t, 1958, Nr 4(9), pp 175 - 180

ABSTRACT: The spectrum of solutions of Pu (VI) and Pu (IV) in 2 n. perchloric and hydrochloric acids in the 200 to 400 m  $\mu$  region consists of one intensive band which is apparently caused by transitions of the 5f-6d type. Its position and absorption coefficient  $\epsilon$  (mole $\cdot$ l. $\cdot$ cm $^{-1}$ ) in HClO $_4$  and HCl are respectively 210, 50,000 and 3,600 m  $\mu$  for Pu (VI) and 213, 2,650 and 2,550 m  $\mu$  for Pu (IV). Two bands of 236 and  $\sim$  216 m  $\mu$  are observed in the spectrum of the hydrochloric acid solution of Pu (III). When nitric acid is added to the Pu (IV) solution, the band maximum shifts toward the greater wavelengths (a shift of 48 m  $\mu$  in 1 n. HNO $_3$ ), its intensity decreases, and a new band with a maximum of  $\sim$  320 m  $\mu$  and an  $\epsilon$  of  $\sim$  500 emerges. In 2 n. H $_2$ SO $_4$ , on the other hand, as a result of the formation of a sulfatic complex, the 213 m  $\mu$  band shifts to 209 m  $\mu$ , and its

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On the Ultraviolet Absorption Spectra of Plutonium Compounds

SOV/58-59-10-23678

intensity increases. In addition, absorption appears in the 250 to 260 m  $\mu$  region. When the Pu (IV)/H<sub>2</sub>C<sub>2</sub>O<sub>4</sub> ratio changes from 1 : 0 to 1 : 1 (the concentration of Pu remaining constant),  $\epsilon$  increases linearly from 2,650 to 4,500. The constant of the Pu (IV)+HC<sub>2</sub>O<sub>4</sub>  $\rightleftharpoons$  PuC<sub>2</sub>O<sub>4</sub><sup>2+</sup> + H<sup>+</sup> reaction is equal to  $(3.0 \pm 1.8) \cdot 10^5$ . (Khim.-tekhn. in-t im. Mendeleyeva, Moscow).

D. Suglovov

Card 2/2

AUTHORS: Kartushova, R. Ye., Rudenko, T. I., Fomin, V. V. SOV/89-5-1-2/28

TITLE: The Thermal Dissociation of the Oxalates of Quadrivalent and Trivalent Plutonium (Termicheskoye razlozheniye oksalator chetyrehvalentnogo i trekhvalentnogo plutoniya)

PERIODICAL: Atomnaya energiya, 1958, Vol. 5, Nr 1, pp. 24-28 (USSR)

ABSTRACT: By means of a recording pyrometer developed by Kurnakov, the process of thermal dissociation (pyrolysis) of various types of plutonium was investigated. The state of intermediate products was determined in the Berg type gas pyrette, by potentiometric titration as well as by the method developed by Penfield (Penfil'd). It was found that the freshly precipitated oxalate of Pu (IV) loses 3 molecules of water at 100° C. From oxalates which had been stored for 3-4 days 1,5 to 2,7% CO+CO<sub>2</sub> are in addition separated at 100° C as a result of dissociation caused by the effect of the plutonium  $\alpha$ -rays. At the same time partial reduction to trivalent plutonium takes place. Within the temperature range of from 170-200° C 2 molecules of water and 13% CO+CO<sub>2</sub> are, in addition, separated. The plutonium is reduced to the trivalent state mainly by the formation of Pu<sub>2</sub>(C<sub>2</sub>O<sub>4</sub>)<sub>3</sub>·H<sub>2</sub>O.

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The Thermal Dissociation of the Oxalates of Quadrivalent  
and Trivalent Plutonium

SOV/89-5-1-2/28

At 380° C the oxalate is transformed into plutonium dioxide. At 140° C the oxalate of Pu (III) is completely freed from water and goes over into plutonium oxide at 270° C in the air. In an inert medium dissociation of the oxalate takes place at 330° C accompanied by the formation of an oxalate carbonate. At 460° C the oxalate carbonate is dissociated and the trivalent plutonium is oxidized to quadrivalent plutonium, while, at the same time, a dioxide is formed. There are 4 figures, 4 tables, and 6 references, 2 of which are Soviet.

SUBMITTED: December 14, 1957

1. Plutonium--Decomposition
2. Plutonium oxylates--Chemical reactions
3. Titration--Applications
4. Gamma rays--Performance

Card 2/2

KOROVINA, I.A.; LIPIS, L.V.; FOMIN, V.V.

Ultraviolet absorption spectra of plutonium compounds. Fiz.  
shor. no.4:175-180 '58. (MIRA 12:5)

1. Moskovskiy ordena Lenina khimiko-tekhnologicheskiy institut  
imeni D.I.Mendeleeva.  
(Plutonium compounds--Spectra)



5(2)

AUTHORS:

Zaborenko, K. B., Kolosov, I. V.,  
Pomin, V. V.

SOV/20-123-4-31/53

TITLE:

Determination of the Composition and the Stability Constants of Lead Chloride Complexes by Experiments on the Distribution of the Radioactive Isotope Between Precipitate and Solution (Opredeleniye sostava i konstant ustoychivosti khloridnykh kompleksov svintsa iz opytov po raspredeleniyu radioaktivnogo izotopa mezhdu osadkom i rastvorom)

PERIODICAL:

Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 4,  
pp 688 - 690 (USSR)

ABSTRACT:

A true thermodynamic equilibrium can be obtained in the distribution of a trace element(m)between the precipitate and the solution of an isomorphous compound of the macrocomponent (M) (Ref 1). The authors considered the co-crystallization to be a reversible exchange reaction of ions of the same valence and derive the equilibrium constant of this reaction (Equation 1). However, all activity coefficients are constant in the case of a low concentration of the microcomponent (m) in the solid phase and at an ionic strength of the solution

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Determination of the Composition and the Stability Constants SOV/20-123-4-31/53  
of Lead Chloride Complexes by Experiments on the Distribution of the Radio-  
active Isotope Between Precipitate and Solution

which is kept practically constant. For this reason, the concentration can be substituted for the activities, by including all activity coefficients in the equilibrium constant. The equation (1) may also be used in the case of the distribution of isomorphous ions of the macrocomponent between the surface and the solution (primary ion exchanging adsorption. It was proved that (Ref 1) the presence of ions forming complexes with M or m changes the distribution "constant". Furtheron the value calculated according to equation (1) is called distribution coefficient, with the analytical concentration determined experimentally being substituted for the equilibrium concentration. The change of this coefficient in dependence on the concentration of the complex forming ion points to the existence of complex ions in the solution (examples are given in references 2,3). It can be proved that the change D is entirely determined by the change of the activity. The authors suggested a method of calculation as mentioned in the title. They investigated the distribution in

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Determination of the Composition and the Stability Constants SOV/20-123-4-31/53  
of Lead Chloride Complexes by Experiments on the Distribution of the Radio-  
active Isotope Between Precipitate and Solution

the system  $\text{SrSO}_4\text{-Pb}^{212}\text{-SO}_4\text{-HCl}$  (methods of references 1,4,5).

If the experimental results are expressed by the formula

$D = \frac{x}{y} \frac{1-y}{1-x}$  (2), where  $x$  and  $y$  are the shares of the micro  
and macrocomponents in the precipitate, and  $1-x$  and  $1-y$  the  
corresponding shares in the solution, then  $D_0 = K$  in the absence  
of the complex former; if, however, in the presence of the  
complex former the analytical concentration is substituted  
in formula (2) the distribution coefficient will be a  
function of the concentration of the ions of the complex former.  
After various calculations the authors obtained the formula  
for the distribution coefficient:

$$\frac{D_0}{D} - 1 = \sum \beta_j [\text{Cl}']^j \quad (5).$$

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equation (5) is similar to the known equations for ion exchange

Determination of the Composition and the Stability Constants SCV/20-123-4-31/53  
of Lead Chloride Complexes by Experiments on the Distribution of the Radio-  
active Isotope Between Precipitate and Solution

and extraction. There are 10 references, 7 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

PRESENTED: July 12, 1958, by V. I. Spitsyn, Academician

SUBMITTED: July 5, 1958

Card 4/4



# NAME I BOOK EXPLANATION

807/5084

International Conference on the Peaceful Uses of Atomic Energy. 24, Geneva, 1958.

Radialy svetitskikh uchastkov. [v. 4.] Kiselev, radionamernov i radiatsionnykh prevrashcheniy (Reports of Soviet Scientists. v. 4.: Chemistry of Radioelements and Radiation Transformations) Moscow, Atomizdat, 1959. 323 p. 8,000 copies printed. (Series: Icos Trudy)

M. (title page): A. P. Vinogradov, Academician; M. I. V. I. Labanov, Tech. Ed.: M. I. Mamal.

NOTE: This collection of articles is intended for scientists and engineers interested in the applications of radioactive materials in science and industry.

CONTENTS: The book contains 26 separate studies concerning various aspects of the chemistry of certain radioactive elements and the processes of radiation effect on matter. These reports discuss present-day methods of reprocessing irradiated nuclear fuel, research in the chemistry of mercury, thorium, uranium, plutonium, and americium, problems related to the sorption and burying of radioactive wastes, the radiolysis of aqueous solutions and of organic compounds, the mechanism of polymer chain grafting, and the effect of radiation on natural and synthetic rubbers. V. I. Frankov edited the present volume. Most of the reports are accompanied by references. Contributions to individual investigations are mentioned in summaries to the Table of Contents.

Almchikov, A. P., L. A. Gerasimov, L. I. Ustin, V. V. Puzin, and L. I. Gerasimov. Production and Properties of Several Binary Compounds of Strontium Plutonium (Report No. 2208)

137

Yakovlev, G. B., and V. K. Kopylov. Investigations on the Chemistry of Americium (Report No. 2127)

137

[A. S. Gerasimov-Gerasimov is mentioned as having supplied the material for the second section of this study.]

Konstantinov, O. Ye.; V. D. Nikol'skiy, E. M. Prigorin, A. Kurbanov, and V. A. Gerasimov. Contribution to the Chemistry of Radioactive Rhenium (Report No. 2133)

165

Solov'ev, V. I., V. D. Belikov, A. P. Kuznetsov, V. V. Gerasimov, E. M. Prigorin, E. M. Vityay, and G. A. Gerasimov. Study of the Migration of Radioactive Elements in Soils (Report No. 2407)

174

Voznesenskiy, S. A., G. A. Gerasimov, P. P. Belikov, and L. I. Gerasimov. Identification of Low-Alkaline and Low-Activity Waste Waters from Radiochemical Plants (Report No. 2024)

189

Bel'tshikov, E. A., A. T. Antonov, V. T. Borshchay, P. V. Muzny, and others. Experimental Technical Plant for Purification of Laboratory Waste Waters Contaminated With Radioactive Elements (Report No. 2025)

194

Ignatov, V. G., and N. M. Kuznetsov. On the Possibility of Burying Radioactive Wastes in Deep-Water Depressions of the Ocean (Report No. 2026)

204

Prokhorov, M. A., and Ye. M. Kolyvagin. Investigations into the Radiochemistry of Arsenic Solutions (Report No. 2027)

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[The investigations were carried out in the Laboratory of Radiochemistry, Laboratory of Radiation Chemistry of the Physicochemical Institute (Leningrad) under the direction of M. A. Karpov, A. A. Karpov, and V. V. Belikov, and A. I. Chernom. The data on radiation reduction reactions were obtained from investigations made at the Laboratory of Y-radiation and electrochemical processes under the direction of V. I. Gerasimov, A. A. Karpov, and G. S. Zuykov. The following are mentioned as having made a study of conjugate reactions such as the formation of dyes from leuco bases: V. D. Gerasimov, A. A. Karpov, L. I. Gerasimov, T. V. Borshchay, and M. Ye. Kuznetsov.]

Bel'tshikov, E. A., V. I. Medvedevskiy, and V. V. Gerasimov. Radiolysis and Radiation Oxidation of Organic Compounds (Report No. 2291)

229

[The following are mentioned: M. A. Karpov and V. P. Zhurkov,

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AUTHORS:

Fomin, V. V., Zagorets, P. A.,  
Morgunov, A. F.

307/78-4-3-33/34

TITLE:

The Extraction of Sulfuric Acid With Benzene Solution of  
Trioctyl Amine (Ekstraktsiya sernoy kisloty rastvorom  
trioktilamina v benzole)

PERIODICAL:

Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 3,  
pp 700-701 (USSR)

ABSTRACT:

The extraction of sulfuric acid by benzene solutions of  
trioctyl amine (TOA=R) was investigated at different acidity.  
For the investigation of polymerization the cryoscopic method  
was used. It was found that in the case of low acidity of the  
solution  $(RH)_2SO_4$  is formed which, with increasing concentra-  
tion, polymerizes in the organic phase. In the case of exces-  
sive sulfuric acid the normal sulfate passes over into acid  
sulfate  $[RHHSO_4]_3$  which forms polymers from 3.3 - 3.4 mole-  
cules. The polymerization constants calculated hold only in  
the case of the polymers  $[(RH)_2SO_4]_2$  or  $[(RH)_2SO_4]_3$ . There are  
2 tables and 3 references, 2 of which are Soviet.

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The Extraction of Sulfuric Acid With Benzene  
Solution of Trioctyl Amine

SOV/78-4-3-33/34

ASSOCIATION: Moskovskiy ordena Lenina khimiko-tekhnologicheskii institut  
im. D. I. Mendeleyeva (Moscow Lenin Order Chemical-techno-  
logical Institute imeni D. I. Mendeleyev)

SUBMITTED: October 12, 1958

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5(2), 21(1)

AUTHORS: Alenchikova, I. F., Zaytseva, L. L., Lipis, L. V.,  
Fomin, V. V. SOV/78-4-5-1/46

TITLE: Separation and Investigation of the Physico-chemical Properties  
of Plutonyl-chloride (Vydeleniye i izucheniye fiziko-khimiches-  
kikh svoystv khloristogo plutonila)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 5, pp 961-962  
(USSR)

ABSTRACT: The synthesis of plutonyl chloride was carried out by the  
vacuum vaporization of a plutonyl chloride solution at room  
temperature. Plutonyl chloride was isolated in form of green-  
ish-yellow crystals of the composition  $\text{PuO}_2\text{Cl}_2 \cdot 6\text{H}_2\text{O}$ . By means  
of electrons and infrared absorption spectra of the plutonyl  
chloride crystals it was proved that this compound contains  
 $\text{PuO}_2^{2+}$ -ions and that no Pu(IV) is present. The spectra of the  
crystals were photographed by means of the spectrograph ISP-51  
(the camera had a focal length of 270 mm) within the range  
of 4200 - 9800 Å. After a longer storage of the plutonyl  
chloride preparation the infrared- and electron adsorption

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SOV/78-4-5-:/46

Separation and Investigation of the Physico-chemical Properties of Plutonyl-chloride

spectra undergo a considerable change. Absorption lines occur in such spectra which are characteristic of  $\text{Pu}^{4+}$ . Under the action of a  $\alpha$ -radiation a reduction of  $\text{Pu(VI)}$  into  $\text{Pu(IV)}$  takes place. The analysis values of plutonyl chloride are shown in a table and the absorption spectra of various solutions and of the obtained crystal of the plutonyl chloride are shown by figures 1 .. 4. There are 4 figures, 1 table, and 2 references, 1 of which is Soviet.

SUBMITTED: April 7, 1958

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5(2).

SOV/78-4-10-17/40

AUTHORS: Fomin, V. V.; Zagorets, P. A.; Morgunov, A. F.; Tertishnik, I.I.

TITLE: Extraction of Iron Chloride by Means of Dibutyl Ether

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 10,  
pp 2276-2286 (USSR)

ABSTRACT: The extraction of  $\text{FeCl}_3$  from hydrochloric acid solutions by means of organic solvents was discussed frequently (Refs 1-16), but no paper gave the structure of the solvates which  $\text{FeCl}_3$  forms there in the organic phase. On passing HCl through a solution of  $\text{FeCl}_3$  in anhydrous isopropyl ether Lorin et al (Ref 9) obtained an insoluble precipitate of the composition  $\text{HFeCl}_4 \cdot 2\text{E}$  (E = ether), which dissolved on addition of water. There are no indications available with respect to the solvation of the compound dissolved. In order to investigate the composition of such solvates, the dependence of the partition coefficient on the concentration of the extracting agent on dilution with an inert solvent and maintenance of all other conditions was investigated. This method is based on the fact that

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Extraction of Iron Chloride by Means of Dibutyl Ether

the extraction is considered a chemical reaction:

$$\text{Fe}^{3+}_{\text{aqu}} + \text{H}^{+}_{\text{aqu}} + x\text{E}_{\text{org}} + y\text{H}_2\text{O} \rightleftharpoons \text{HFeCl}_4 \cdot x\text{E} \cdot y\text{H}_2\text{O}_{\text{org}}$$
 (org=organic phase). If the concentration of the ions  $\text{H}^{+}$  and  $\text{Cl}^{-}$  is kept constant and no polymerization occurs, the logarithm of the partition coefficient must be a linear function of the equilibrium concentration of the ether. In order to be able to maintain the concentration of  $\text{H}^{+}$  and  $\text{Cl}^{-}$ , it must be known, how far the acid is extracted by the ether. Therefore the first part of this paper deals with the extraction of  $\text{HCl}$  by dibutyl ether (DBE) and by mixtures of DBE and  $\text{CCl}_4$  and DBE and benzene (Tables 1-3, Figs 1-3). The results indicate that in the organic phase the compound  $\text{HCl} \cdot \text{DBE}$  occurs which is also confirmed by cryoscopy. Then, the extraction of  $\text{FeCl}_3$  with the same solvents is investigated (Tables 6-7, Fig 4). On extraction from 10-n  $\text{HCl}$  the trisolvate  $\text{FeCl}_3 \cdot x\text{HCl} \cdot 3\text{DBE} \cdot y\text{H}_2\text{O}$  is formed in the organic phase. If DBE is diluted with benzene, the partition coefficient is directly proportional to the third power of the DBE activity, whereas on dilution with  $\text{CCl}_4$  the partition coefficient decreases more rapidly than would correspond with the

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Extraction of Iron Chloride by Means of Dibutyl Ether

calculated activity of DBE. There are 4 figures, 10 tables, and 22 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy khimiko-tekhnologicheskii institut im. D. I. Mendeleeva (Moscow Institute of Chemical Technology imeni D. I. Mendeleev)

SUBMITTED: July 2, 1958

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05866

SOV/78-4-11-19/50

5(2)

AUTHORS:

Mayorova, Ye.P., Fomin, V.V.

TITLE:

The Influence Exercised by Sulphate Ions on the Distribution Coefficient of Macroquantities of Thorium in the Extraction by Tributyl Phosphate

PERIODICAL:

Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 11, pp 2511-2514 (USSR)

ABSTRACT:

In previous papers (Refs 1-3) the authors calculated the stability constants of the ions  $\text{Th}(\text{NO}_3)_j^{4-j}$ ,  $\text{Th}(\text{SO}_4)_k^{4-2k}$  and  $\text{Th}(\text{NO}_3)_j \cdot (\text{SO}_4)_k^{4-j-2k}$  as well as the reaction constant for the formation of the compound  $\text{Th}(\text{NO}_3)_4 \cdot 2\text{TBPh}$  (TBPh = tributyl phosphate). These experiments were made with microquantities of thallium. The authors dealt with the problem as to whether the resultant constants held also for the extraction of weighable thorium quantities by means of TBPh from sulphate-nitrate solutions of an ionic strength of 1.7. The ionic strength was kept constant by corresponding additions of  $\text{NaClO}_4$ . The experimental and the calculated coefficients

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The Influence Exercised by Sulphate Ions on  
the Distribution Coefficient of Macroquantities of  
Thorium in the Extraction by Tributyl Phosphate

are compared in table 1. Herefrom it may be seen that a change in the composition of the solution does not affect the values of the constants at constant ionic strength. The coefficients obtained therefore hold also for weighable amounts of thorium. There are 1 table and 3 Soviet references.

SUBMITTED: August 18, 1958

Card 2/2

FOMIN, Vladimir Vladimirovich; ALYAB'YEV, A.F., red.; MAZEL', Ye.M.,  
tekh.n.red.

[Chemistry of extraction processes] Khimiia ekstraktsionnykh  
protsessov. Moskva, Gos.izd-vo lit-ry v oblasti atomnoi nauki  
i tekhniki, 1960. 165 p. (MIRA 14:3)  
(Extraction (Chemistry))



LIPIS, L.V.; POZHARSKIY, B.G.; FOMIN, V.V.

Spectrophotometric study of the processes involving complex  
formation by tetravalent plutonium in nitric acid solutions.  
Zhur. struk. khim. 1 no.2:135-144 J1-Ag '60. (MIRA 13:9)  
(Plutonium compounds--Spectra)

LIPIS, L.V.; POZHARSKIY, B.G.; FOMIN, V.V.

Complex formation by tetravalent plutonium in sulfuric acid  
solutions. Zhur. strukt. khim. 1 no.4:417-424 N-D '60.  
(MIRA 14:2)

(Plutonium compounds)

5(2) 5.1110

68122  
SOV/76-5-1-42/45

AUTHORS: Fomin, V. V., Morgunov, A. F.

TITLE: Extraction by Means of a Binary Extracting Mixture

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol 5, Nr 1,  
pp 233-234 (USSR)

ABSTRACT: In the present paper the authors investigated the extraction of  $UO_2(NO_3)_2$  and  $HNO_3$  by means of cyclohexanone, methyl-isobutyl ketone (hexone) and their mixture as well as the extraction of  $FeCl_3$  by means of ethers and their mixtures. Figure 1 shows the dependence of the logarithm of the distribution coefficient  $\alpha$  on the logarithm of concentration  $S$  of the extracting agent. The determination was carried out at  $20 \pm 0.2^\circ$ . It was attempted to extract  $FeCl_3$  by means of diisopropyl ether (DPE) and diisocamyl ether (DAE). In the extraction of uranyl nitrate and nitric acid there is a linear dependence of the logarithm of  $\alpha$  on the logarithm of concentration of the ketones (Kt) with a concentration of up to 4 moles/l of the latter. For the straight section it holds that  $\alpha = KS^n$  according to the formation of one solvate with  $n$  molecules of the ex-

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SOV/78-5-1-42/45

Extraction by Means of a Binary Extracting Mixture

tracting agent per 1 molecule of the extracted substance. The formation of the solvates  $\text{HNO}_3 \cdot 2\text{Kt}$ ,  $\text{UO}_2(\text{NO}_3)_2 \cdot 4\text{Kt}$  may be seen from the slope of the straight. The solvate  $\text{HFeCl}_4 \cdot 4\text{DPE}$  results in the extraction of  $\text{FeCl}_3$ , whereas in the case of DAE ( $n=2.5$ ) either the formation of two solvates ( $\text{HFeCl}_4 \cdot 2\text{DAE}$  and  $\text{HFeCl}_4 \cdot 3\text{DAE}$ ) or a considerable change of the activity coefficients in the organic phase is assumed. Figure 2 illustrates the dependence of the distribution coefficient upon the composition of the organic phases for the extraction with the benzene solution of two extracting agents. In all cases this distribution coefficient was greater than the sum of distribution coefficients of the individual components wherefrom the formation of mixed solvates was concluded. There are 2 figures and 2 Soviet references.

ASSOCIATION: Moskovskiy ordena Lenina khimiko-tekhnologicheskii institut im. D. I. Mendeleyeva (Moscow "Order of Lenin" Institute of Chemical Technology imeni D. I. Mendeleyev)

SUBMITTED: July 3, 1959

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~~5695~~ 69035

S/078/60/005/05/10/037

B004/B016

21.1320

5.2200

AUTHORS:

Yegorov, G. F., Fomin, V. V., Frolov, Yu. G., Yagodin, G. A.

TITLE:

Solvate Forms of Zirconium- and Hafnium Nitrates With Tri-  
butyl Phosphate

PERIODICAL:

Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 5,  
pp. 1044-1050

TEXT: In the introduction, the authors mention in brief the problems dealt with: preparation of zirconium with a minimum hafnium content, investigation of the mechanism of the  $(C_4H_9O)_3PO$  (TBP) extraction, investigation of the solvate form. Next, they describe the purification of the reagents. The partition coefficients of Zr and Hf were determined by means of  $Zr^{95}$  and  $Hf^{181}$ . The resultant  $Nb^{95}$  was separated from  $Zr^{95}$  by means of  $MnO_2$ . The extractions were carried out at  $20^\circ$  and at a zirconium- and hafnium concentration of  $10^{-5}$  moles/l. First of all, the extraction of nitric acid by tributyl phosphate (TBP) at different acidity and concentration of the  $NO_3^-$

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65995 69535

Solvate Forms of Zirconium- and Hafnium  
Nitrates With Tributyl Phosphate

S/078/60/005/05/10/037  
B004/B016

ions was investigated. In this connection, the authors refer to papers by A. S. Solovkin (Ref. 2), A. M. Rozen (Ref. 6), V. V. Fomin, and Ye. P. Mayorova (Refs. 3,4,7). The existence of the complexes  $\text{TBP} \cdot \text{HNO}_3$  and  $\text{TBP} \cdot 2\text{HNO}_3$  assumed by the last-mentioned authors in Ref. 7, and the values of their instability constants (0.22 and 0.00044) were confirmed experimentally (Table 1). Xylene was used as the solvent for TBP. The dependence of the nitric-acid extraction on the concentration of hydrogen ions and in the presence of  $\text{NaNO}_3$ ,  $\text{NH}_4\text{NO}_3$ ,  $\text{LiNO}_3$  or  $\text{Mg}(\text{NO}_3)_2$  is shown in table 2. The mechanism assumed of  $\text{HNO}_3$  extraction holds in a wide range also in the presence of an excess of  $\text{NO}_3^-$  ions. It is proved for the extraction of Zr and Hf that the partition coefficients  $d$  are proportional to the concentration of free TBP in the organic phase. The number of solvating TBP molecules was determined from the dependence of  $\log d$  on  $\log(\text{TBP})_{\text{org}}$ . Experimental data for zirconium are presented in table 3, for hafnium in table 4. It resulted that partition coefficients of Zr and Hf increased with increasing TBP con-

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Solvate Forms of Zirconium- and Hafnium  
Nitrates With Tributyl Phosphate

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S/078/60/005/05/10/037  
B004/B016

centration in the organic phase. On the basis of the diagram  $\log \alpha$ ,  $\log(\text{TBP})$  (Fig. 1), the formation of the solvate  $\text{M}(\text{NO}_3)_4 \cdot \text{TBP}$  results, for low TBP concentrations and the solvate  $\text{M}(\text{NO}_3)_4 \cdot 2\text{TBP}$  for higher TBP concentrations. At  $\text{HNO}_3$  concentrations of 5 moles/l the formation of more complicated complexes is assumed, which, however, was not further investigated. Figs. 2,3 depict the dependence of the partition coefficients of Zr and Hf on the hydrogen-ion concentration and the concentration of the added nitrates. The  $\alpha$ -values decrease with decreasing hydrogen-ion concentration. This decrease, however, depends on the type of the added nitrate. In the presence of  $\text{NH}_4^+$  and  $\text{Na}^+$ , bivalent ions,  $\text{ZrO}^{2+}$ , or  $\text{Zr}(\text{OH})_2^{2+}$  are dissolved. The deviation of the dependence of  $\alpha$  from linearity in the presence of  $\text{Li}^+$  and  $\text{Mg}^{2+}$  is explained by a stronger hydration of these ions. There are 3 figures, 4 tables, and 7 references, 6 of which are Soviet.

SUBMITTED: February 4, 1959

Card 3/3

FOMIN, V.V.; KARTUSHOVA, R.Ye.; MAYOROVA, Ye.P.

Study of the extraction of nitric acid, perchloric acid, and uranyl nitrate with tributyl phosphate solutions, using the method of isomolar series. Zhur.neorg.khim. 5 no.6:1337-1344 Je '60.

(Extraction (Chemistry))

(MIRA 13:7)

(Butyl phosphate)



FOMIN, V.V.; MASLOVA, R.N.; ZAYTSEVA, L.L.

Study of the extraction of nitric acid using the method of isomolar series. Zhur.neorg.khim. 5 no.6:1383-1384 Je '60. (MIRA 13:7)  
(Nitric acid) (Extraction (Chemistry))

FOMIN, V.V.; MORGUNOV, A.F.

Extraction of ferric chloride hydrates with ethers. Zhur.neorg.  
khim. 5 no.6:1385-1386 Je '60. (MIRA 13:7)

1. Moskovskiy ordena Lenina khimiko-tekhnologicheskii institut im.  
D.I.Mendeleeva.

(Extraction (Chemistry)) (Iron chloride)

FOMIN, V.V.; MORGUNOV, A.F.; KOROBOV, I.V.

Extraction of nitric acid with cyclohexane and methyl isobutyl ketone. Zhur. neorg. khim. 5 no.8:1846-1851 Ag '60.

(MIRA 13:9)

1. Moskovskiy khimiko-tekhnologicheskii institut im. D.I.Mendeleeva.  
(Ketone) (Nitric acid) (Cyclohexane)

S/078/60/005/010/006/021  
B004/B067

AUTHORS: Lipis, L. V., Pozharskiy, B. G., Pozharskaya, M. Ye.,  
Pomin, V. V.

TITLE: Complex Sulfates of Tetravalent Plutonium With Alkali Metals

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 10,  
pp. 2190-2203

TEXT: The authors produced complex plutonium alkali metal sulfates by dissolving plutonium sulfate in 1 N H<sub>2</sub>SO<sub>4</sub>, saturating the solution with alkali sulfate, centrifuging after 24 hours, removing the excess alkali sulfate by washing with 1 N H<sub>2</sub>SO<sub>4</sub>, and removing the excess H<sub>2</sub>SO<sub>4</sub> by washing with alcohol and, finally, with ether. The complex salts of Pu(IV) with Na, K, Rb, Cs, and NH<sub>4</sub> were produced. Tables 1-5 give the analyses of these compounds. On the basis of the analyses, the following

formulas are obtained:  $\text{Na}_6\text{Pu}(\text{SO}_4)_5 \cdot \text{H}_2\text{O}$ ;  $(\text{NH}_4)_6\text{Pu}(\text{SO}_4)_5 \cdot 2-4\text{H}_2\text{O}$ .  
 $\text{K}_4\text{Pu}(\text{SO}_4)_4 \cdot 2\text{H}_2\text{O}$ ,  $\text{Rb}_4\text{Pu}(\text{SO}_4)_4$ , and  $\text{CsPu}(\text{SO}_4)_4$ . The production of a pure

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Complex Sulfates of Tetravalent Plutonium  
With Alkali Metals

S/078/60/005/010/006/021  
B004/B067

complex salt with lithium failed since it could not be separated from  $\text{LiSO}_4$ . The complex salts are readily soluble in water and mineral acids. Table 6 gives the pH values at which the precipitation of basic sulfate sets in. The solubility of potassium-plutonium sulfate in nitric acid (Table 7), in sulfuric acid (Table 8), and in 3, 5, and 10% solutions of  $\text{K}_2\text{SO}_4$  in 1 N  $\text{H}_2\text{SO}_4$  (Table 9) was radiometrically determined at  $25^\circ\text{C}$ .

Hydrolysis occurred on dissolution in water. Figs. 1-7 show the microphotographs of the absorption spectra of the complex salts and of  $\text{Pu}(\text{SO}_4)_2$  recorded by an ИСП-51 (ISP-51) spectrograph at  $-195.8^\circ\text{C}$  and by an Молл К-15 (Moll K-15) microphotometer. The spectra differ from one another as well as from the spectrum of plutonium sulfate. The spectra of the pentasulfate complexes of Na and  $\text{NH}_4$ , as well as of the tetrasulfate complexes of K, Rb, and Cs show certain similarities. On the basis of the spectrum, a content of at least six sulfate groups is assumed for the impurely prepared lithium complex salt. The spectrum and color of the complex salts of rubidium and cesium changed when stored in air, whereas no change was observed in hermetically sealed samples. There are 7 figures, 9 tables, and 4 references: 3 Soviet and 1 US. ✓

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MASLOVA, R.N.; FOMIN, V.V.

Extraction of nitric acid and water with ethyl n-propyl ether and  
n-propyl ether. Zhur. neorg. khim. 6 no.3:738-745 Mr '61.

(MIRA 14:3)

(Nitric acid) (Ether) (Extraction(Chemistry))

21.725

S/078/61/006/007/002/014  
B107/B217

21.4100

AUTHORS: Alonchikova, I. F., Zaytseva, L. L., Lipis, L. V.,  
Nikolayev, N. S., Fomin, V. V., Chebotarev, N. T.

TITLE: Properties of plutonyl fluoride complexes

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 6, no. 7 1961, 1513-1519

TEXT: The object of the present study was the production and investigation of plutonyl fluoride complexes with alkali metals. The systems  $\text{PuO}_2\text{F}_2 - \text{MeF} - \text{H}_2\text{O}$  with  $\text{Me} = \text{Na}, \text{K}, \text{NH}_4, \text{Rb}, \text{Cs}$  were investigated in the range  $\text{Me/Pu} = 1$  to 50 by means of electron absorption spectra. The latter were recorded by means of the MGP-51 (ISP-51) spectrograph at the boiling temperature of liquid nitrogen. The compounds prepared were analyzed; Table 1 provides a list of the compounds produced as well as the analytical values. The compounds  $\text{MePuO}_2\text{F}_3 \cdot \text{H}_2\text{O}$  are isotopic and of cubic symmetry.

Fig. 2 shows schematically the powder diagrams, obtained in the PKJ-86 (RKU-86) camera with chromium radiation, for the following compounds (lattice constant in brackets):  $\text{KPuO}_2\text{F}_3 \cdot \text{H}_2\text{O}$  (8.126 Å),  $\text{RbPuO}_2\text{F}_3 \cdot \text{H}_2\text{O}$

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24725

S/078/61/006/007/002/014  
B107/B217

Properties of plutonyl ....

(8.458 Å),  $\text{CsPuO}_2\text{F}_3 \cdot \text{H}_2\text{O}$  (8.916 Å). Furthermore, a series of isotopic compounds  $\text{Me}_2\text{PuO}_2\text{F}_4$  exists; Fig.3 shows the powder diagrams for  $\text{K}_2\text{PuO}_2\text{F}_4$  and  $(\text{NH}_4)_2\text{PuO}_2\text{F}_4$  in schematic form. The compound  $\text{Cs}(\text{PuO}_2)_2\text{F}_5 \cdot 3\text{H}_2\text{O}$  was also found; the radiogram is very rich in lines (Fig.9) and indicates a low symmetry. The absorption spectra are characterized by the bands for  $\text{Pu}^{\text{VI}}$  between 8280 and 8330 Å, as well as between 6200 and 5600 Å. The stability of the compound  $\text{MePuO}_2\text{F}_3 \cdot \text{H}_2\text{O}$  was found to decrease on the transition from sodium to cesium. There are 11 figures, 4 tables, and 15 references: 2 Soviet-bloc and 13 non-Soviet-bloc. The reference to English-language publication reads as follows: H. H. Anderson. Paper 6, 21 of the Transuranium Elements, 14B, New York, 1949.

SUBMITTED: May 30, 1960

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5.4000,16.7100

78557  
SOV/89-8-3-22/32

FORMIN, V.V.  
P.2

AUTHOR: Seryakova, I. V.

TITLE: Symposium on Extraction Theory. News in Science and Technology

PERIODICAL: Atomnaya energiya, 1960, Vol 8, Nr 3, pp 269-270 (USSR)

ABSTRACT: The symposium on theory of extraction processes was held on December 3-4, 1959, at the (Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy AS USSR (Institut geokhimii i analiticheskoy khimii imeni V. I. Vernadskiy AN SSSR). The aim was to evaluate the most important problems of the extraction theory. There were five papers on questions of chemistry and thermodynamics of extraction equilibria, on the influence of the nature of extragents and salting-out agents, on the composition of the extracted compounds and their interaction with molecules of water and the extragent. V. I. Kuznetsov reported on "The Chemistry of Extraction Processes," based on the theory of action analytical organic reagents. He attempted to compare

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Symposium on Extraction Theory. News  
in Science and Technology

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the tendency of ions to form extracting compounds with the quantity  $z/n$  of that ion, where  $z$  is the charge of the ion, and  $n$  is the number of atoms in that ion. K. B. Yatsimirskiy and M. M. Senyavin were critical of such an oversimplified approach. V. V. Fomin presented a paper on "Extraction Equilibria," in which the investigated those chemical reactions in which the extractant participates in both phases. He notes that an element during the extraction process need not lose its hydrophilic nature. A. A. Lipovskiy and V. A. Mikhaylov together with the author discussed the merits of the accepted view of the oxonium mechanism of extraction of elements. The paper by A. V. Nikolayev, N. M. Sinitsyn, and A. M. Shubina, "Donor-Acceptor Properties of Extragents," dealt with the influence of the nature of organic solvent on extraction. According to their data, an increase in dipole moments augments the degree of element extraction. N. N. Basargin pointed out in the discussion that in the case of elements having a tendency to build covalent bonds, the result may be just the opposite.

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V. G. Timoshev discussed the decisive role of donor-acceptor properties of phosphorus-containing extragents. The salting out in extraction processes was investigated in the paper by O. Ya. Samoylov and V. I. Tikhomirov using statistical inquiry into the thermal motion of molecules. Basically, the explanation given took into account the dehydrating properties of salting-out cations. A. A. Nemodruk pointed out during discussion that one should take into account also the anion concentration of the salting-out agent and other factors. A. M. Rozen presented in his paper the use of thermodynamics in describing the extraction equilibria. It was noted during discussion that many thermodynamic quantities should be measured in tests at different temperatures. V. M. Vdovenko, A. K. Babko, D. D. Suglobqv, I. R. Krichevskiy, and A. A. Chaykhorskiy participated also in the general discussion. The symposium determined the main course of future investigations of the theory of extracting processes, in particular: to explain the reasons for the selectivity of the solubility of anorganic and organic compounds in various solvents; to

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Symposium on Extraction Theory. News  
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expend the investigations of solvation, and particularly, hydration of ions and molecules, to study further the chemism and thermodynamics of extraction equilibria; and to expand inquiries determining the composition and nature of the extracting compounds. The symposium recommended the establishment of a permanent seminar dealing with the theory of extraction. The basic materials of this symposium will be published in 1960 by Atomizdat.

Card 4/4

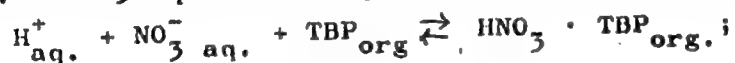
S/830/62/000/001/010/012  
E111/E592

AUTHORS: Fomin, V.V., Mayorova, Ye.P. and Kartushova, R.Ye.

TITLE: Determination of the number of theoretical stages of an extraction column by an analytical method

SOURCE: Ekstraktsiya; teoriya, primeniye, apparatura. Ed. by A.P. Zefirov and M. M. Senyavin. Moscow, Gosatomizdat, 1962, 188-201.

TEXT: An analytical method of calculating extraction for two macro-components present simultaneously is developed and exemplified by the extraction of uranyl nitrate and nitric acid with tributyl phosphate (TBP). The mass balance equations for uranium and nitric acid for each  $n^{\text{th}}$  stage of the extraction column are formulated, together with all the equilibrium constants, activity coefficients and dissociation constant of the fundamental reaction controlling this type of extraction, viz:



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Determination of the number of ...

S/830/62/000/001/010/012

E111/E592



The main difficulty in calculating the number of theoretical stages lies in the reaction forming solvates of nitric acid and uranyl nitrate with TBP. Because of the large errors involved, the constants for the acid were assumed to remain unchanged. Calculated values were found to be in good agreement with experimental results, viz. for initial uranium and acid concentrations of 1.26 and 2 M, respectively. An appendix is included giving a working example for calculating a theoretical stage. There are 6 figures and 6 tables.

Card 2/2

FOMIN, V.V.; MAYOROVA, Ye.P.; KARTUSHOVA, R.Ye.

Determination of the number of theoretical stages of  
an extraction column by the analytical method. Ekstr.;  
teor.,prim.,app. no.1:188-201 '62. (MIRA 15:11)  
(Extraction apparatus)

ROMIN, V.V.; MASLOVA, R.N.

Extraction of uranyl nitrate from nitric acid solutions by  
normal ethers. Ekstr., teor., prim., app. no. 2:19-33 '62.  
(MIRA 15:9)

(Uranyl nitrate)      (Ethers)



FOMIN, V.V.; KARTUSHOVA, R.Ye.; MAYKOVA, Ye.P.

Extraction of uranium by mixtures of tributyl phosphate and  
diisooamyl ester of methylphosphonic acid. Ekstr.; teor., prim., app.  
no. 2:37-46 '62. (MIRA 15:9)  
(Uranium) (Butyl phosphate) (Phosphonic acid)

S/186/62/004/005/003/009  
E075/E135

AUTHORS: Maslova, R.N., and Fomin, V.V.

TITLE: Study of the mechanism of extractive processes.  
IV. Solvation and hydration of uranyl nitrate in  
benzene solutions of simple ethers

PERIODICAL: Radiokhimiya, v.4, no.5, 1962, 550-560

TEXT: A study was made of the dependence of distribution coefficients ( $\alpha'$ ) of tracer quantities of uranyl nitrate on the concentration of ether in the organic phase during extraction with ethers and benzene. The ethers investigated were: dibutyl (DBE), dipropyl (DPE), ethylpropyl (EPE), and methylbenzyl ether (MBE). For a constant composition of the equilibrium aqueous phase  $\lg \alpha'$  varies linearly with the concentration of free extractant. The composition of uranium nitrate solvates  $UO_2(NO_3)_2 \cdot (H_2O)_h \cdot (R_2O)_n$ , where  $R_2O$  - ether molecule in the organic phase, was determined, from the slopes of the extraction curves and from cryoscopic data. The two methods gave similar values for the number  $n$  of ether molecules bound in the solvate. For DBE and EPE the values were

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Study of the mechanism of ...

S/186/62/004/005/003/009  
E075/E135

2.7 to 2.2 and 3.04 to 3.1 respectively. The values of  $n$  do not depend on the acidity of the aqueous solution. The number of water molecules bound in the solvate ( $h$ ) was determined for undiluted ethers and for ether-benzene mixtures. The degree of hydration of  $UO_2(NO_3)_2$  falls with decreasing concentration of ethers in the original benzene-ether mixture. Comparing  $n$  and  $h$  for  $UO_2(NO_3)_2$  it was established that trisolvates are formed with EPE and DPE. The value of  $h$  changes from about 3 for undiluted EPE to 2.5 for the equimolar mixture of EPE and benzene. The values of  $2 < h < 3$  are explained by the existence of di- and trihydrates of  $UO_2(NO_3)_2$ . In general, for the mixtures of aliphatic ethers with benzene containing excess ether, the hydratosolvates contain equal numbers of molecules of water and ether. Dilution with benzene gives less hydrated solvates. For undiluted MBE,  $n \approx 4$  and  $h \approx 3$ . Dilution reduces  $h$  to 2.3 and  $n$  to 3.3. The dependence of activity coefficients of hydratosolvates on the molar proportion of benzene  $N$  in the solvent mixture is given by  $f = 1 - N_{\text{benzene}}/A$ , where the reciprocal of hydratosolvate activity is  $f$ , and  $A = 1$  for EPE and 1.3 for DPE. The molar

Card 2/3

Study of the mechanism of ...

S/186/62/004/005/003/009  
E075/E135

activity coefficients for tracer quantities of  $\text{UO}_2(\text{NO}_3)_2$  in 6.3 M and 4.25 M  $\text{HNO}_3$  are 2.15 and 1.41 respectively. The latter activities agree well with those calculated from the constants for the extraction of  $\text{UO}_2(\text{NO}_3)_2$  with MBE from 4.3 M  $\text{HNO}_3$ . Assuming that the organic phases are ideal solutions, the constants for the formation of the hydratosolvates were calculated to be

$4.3 \times 10^{-4}$ ,  $9.0 \times 10^{-4}$ ,  $9.2 \times 10^{-4}$  and  $2.8 \times 10^{-4}$  for  $\text{UO}_2(\text{NO}_3)_2 \cdot 2 \text{H}_2\text{O} \cdot 3 \text{MBE}$ ,  $\text{UO}_2(\text{NO}_3)_2 \cdot 3 \text{H}_2\text{O} \cdot 4 \text{MBE}$ ,  $\text{UO}_2(\text{NO}_3)_2 \cdot 3 \text{H}_2\text{O} \cdot 3 \text{EPE}$ , and  $\text{UO}_2(\text{NO}_3)_2 \cdot 3 \text{H}_2\text{O} \cdot 3 \text{DPE}$  respectively.

There are 2 figures and 5 tables.

SUBMITTED: July 5, 1961

Card 3/3

MORGUNOV, A.F.; FOMIN, V.V.

Hydration of complex halogen acids of metals during extraction  
with ethers. Zhur.neorg.khim. 7 no.4:948-950 Ap '62.

(MIRA 15:4)

1. Moskovskiy khimiko-tekhnologicheskii institut im. D.I.Mendeleeva.  
(Complex compounds) (Halides) (Ethers)

FOMIN, V.V.

"Problems involved in the mechanism of extraction." (reply to  
the remarks by I.U.G.Frolov and A.V.Ochkin). Zhur.neorg.khim.

7 no.6:1490 Je '62.

(MIRA 15:6)

(Extraction (Chemistry)) (Frolov, I.U.G.) (Ochkin, A.V.)

S/078/62/007/007/002/013  
B179/B101

AUTHORS: Zaytseva, L. L., Lipis, L. V., Fomin, V. V., Chebotarev, N. T.

TITLE: Production and properties of some uranyl fluoride complexes

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 7, no. 7, 1962, 1538-1547

TEXT: The precipitates formed in the reaction between 6.08 M CsF solution and 0.63 M  $\text{UO}_2\text{F}_2$  solution were investigated in the range of concentration (C)  $c_{\text{Cs}^+} : c_{\text{UO}_2^{2+}} = 0.5 - 20$  by means of absorption spectroscopy, X-ray analysis, and chemical analysis. Three Cs-UO<sub>2</sub>-fluoride complexes were formed:  $\text{CsUO}_2\text{F}_3$  at C = 0.5 - 1.5;  $\text{Cs}_2\text{UO}_2\text{F}_4 \cdot \text{H}_2\text{O}$  at C = 2-3;  $\text{Cs}_3\text{UO}_2\text{F}_5$  at C = 6 - 20 and a mixture of  $\text{Cs}_2\text{UO}_2\text{F}_4 \cdot \text{H}_2\text{O}$  with  $\text{Cs}_3\text{UO}_2\text{F}_5$  at C = 3 - 5.  $\text{CsUO}_2\text{F}_3$  is a finely crystalline, yellow substance soluble in diluted  $\text{HNO}_3$ , poorly soluble in  $\text{H}_2\text{O}$ ; it hydrolyzes in aqueous solution. Both  $\text{Cs}_2\text{UO}_2\text{F}_4 \cdot \text{H}_2\text{O}$  and  $\text{Cs}_3\text{UO}_2\text{F}_5$  form green crystals, are soluble in  $\text{H}_2\text{O}$   
Card 1/2

Production and properties of some...

3/078/62/007/007/002/015  
B179/B101

and undergo hydrolysis. All three compounds are insoluble in alcohol, ether, and acetone. The solubility of cesium uranyl fluoride complexes in  $H_2O$  increases in the order  $CsUO_2F_3$ ,  $CsUO_2F_3 \cdot H_2O$ ,  $Cs_2UO_2F_4 \cdot H_2O$ ,  $Cs_3UO_2F_5$ .  $Cs_2UO_2F_4 \cdot H_2O$  forms in vacuum evaporation of 0.63 M  $UO_2F_2$  and 6.08 M  $CsF$  solutions at the molecular ratio of 1:2.  $CsUO_2F_3 \cdot H_2O$  forms in slow evaporation of these solutions in the air.  $Cs_2UO_2F_4 \cdot H_2O$  forms in slow evaporation of saturated  $UO_2F_2$  and  $CsF$  solutions at the molecular ratio of 1:2 in the air. At the molecular ratio of 1:1,  $CsUO_2F_3$  readily precipitates only from concentrated  $UO_2F_2$  and  $CsF$  solutions; diluted solutions give a mixture of  $CsUO_2F_3$  and  $CsUO_2F_3 \cdot H_2O$ . The interplanar spacings of the crystals  $CsUO_2F_3$ ,  $CsUO_2F_3 \cdot H_2O$ ,  $Cs_2UO_2F_4 \cdot H_2O$ , and  $Cs_3UO_2F_5$  were calculated and the wavelengths of the principal absorption bands were measured; these range between 4200 and 6000 Å. There are 8 figures and 8 tables.

SUBMITTED: December 24, 1960  
Card 2/2



MORGUNOV, A.F.; FOMIN, V.V.

Extraction of ferric chloride with ethers and ketones. Dependence of the distribution coefficient on the concentration of ferric chloride. Zhur.neorg.khim. 8 no.2:508-515 F '63. (MIRA 16:5)

1. Moskovskiy khimiko-tekhnologicheskii institut imeni D.I. Mendeleeva.

(Iron chlorides) (Extraction (Chemistry))

FOMIN, V.V.; POTAPOVA, V.T.

Extraction of nitric acid with amines. Zhur.neorg.khim. 8 no.4:  
990-1002 Ap '63. (MIRA 16:3)  
(Nitric acid) (Amines) (Extraction (Chemistry))

FOMIN, V.V.

Remark on B.Z. Iofa and G.M. Dakar's article: "Extraction of complex acids by oxygen-containing solvents. Part 2: Calculation of the equilibrium constants of antimony (V) hydrolysis in hydrochloric acid solutions and the study of the mechanism of its extraction by di-n-butyl ester." Radiokhimiia 6 no.3: 378-380 '64. (MIRA 18:3)

ACCESSION NR: AP4043658

8/0056/64/047/002/0771/0773

AUTHORS: Anisovich, N. V.; Moskalev, A. N.; Fomin, V. V.

TITLE: Influence of logarithmic singularities on the parameters of certain resonances

SOURCE: Zh. eksper. i teor. fiz., v. 47, no. 2, 1964, 771-773

TOPIC TAGS: resonance scattering, omega meson, sigma particle, pion, rho meson

ABSTRACT: The purpose of this note is to call attention to the fact that resonances in the systems  $\rho\pi$  (A-resonance),  $\omega\pi$  (B-resonance), and  $\Sigma\pi$  ( $Y_0^{*}$ -resonance) were investigated in the past in the majority of cases under conditions in which the spectra of the particles  $\rho\pi$ ,  $\omega\pi$ , and  $\Sigma\pi$ , in the region of resonant values of energy could be strongly influenced by logarithmic singularities of the type indicated by I. J. R. Aitchison, (Phys. Rev. v. 133, B1257, 1964).

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ACCESSION NR: AP4043658

Arguments are presented in favor of assuming that the observed large width of the A-resonance is indeed connected with the presence of such singularities. The decrease in the probability of  $\omega\pi^+$  production in the vicinity of 150 MeV, which has effectively led to a decrease in the observed resonance width, is also ascribed to this singularity. In the case of the  $\Sigma\pi$  resonance, it is quite possible that the  $\lambda_{1405}$  resonance does not exist at all. "The authors express deep gratitude to V. M. Shekhter for a discussion of several problems and to N. B. Brovtsy\*na for carrying out the numerical calculations." Orig. art. has: 2 figures and 2 formulas.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk SSSR (Physicotechnical Institute, Academy of Sciences SSSR)

SUBMITTED: 24Apr64

ENCL: 00

SUB CODE: NP

NR REF SOV: 001

OTHER: 011

Card 2/2

L 11969-66 EWT(m) DIAAP

ACC NR: AP6001164 SOURCE CODE: UR/0367/65/002/003/0562/0564

AUTHOR: Anisovich, V.V. (Fomin, V.V. *Deceased*) 25 3

ORG: Physicotechnical Institute im. A. F. Ioffe, Academy of Sciences SSSR (Fiziko-  
tekhnicheskiy institut Akademii nauk SSSR)

TITLE: Effect of singularities of triangular diagrams with decay masses on mass spectra  
of the systems  $\pi + \Delta_{1230}$ ,  $\pi + \Sigma_{1385}$  and  $\pi + \phi$ . 1455

SOURCE: Yadernaya fizika, v. 2, no. 3, 1965, 562-564

TOPIC TAGS: pi meson, meson interaction, proton

ABSTRACT: The influence of logarithmic singularities arising in the triangular diagrams shown in Fig. 1 on the cross sections of the reactions  $\pi^- + p \rightarrow \pi + \Delta_{1230}$  and  $K^- + p \rightarrow \pi + \Sigma_{1385}$  and on the mass spectrum of the system  $\pi + \phi$  was studied. It is shown that these diagrams can lead to anomalies in the cross sections (or in mass spectra) amounting to as much as 10 to 20% of the background at  $M_{\pi\Delta_{1230}} = 2.38$  GeV,  $M_{\pi\Sigma_{1385}} = 2.62$  GeV, and  $M_{\pi\phi} = 1.4$  GeV. The appreciable magnitude of these anomalies permits their experimental observation at the present time. Authors are grateful to N. B. Brovtsyna for

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2

L 11969-66

ACC NR: AP6001164

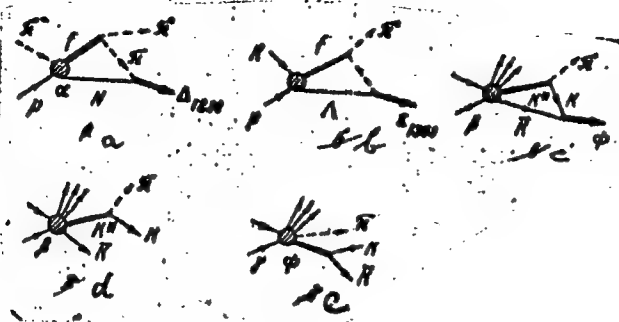


Fig. 1. Triangular diagram of reaction process.

assistance in performing the numerical calculations. Orig. art. has: 3 figures.

SUB CODE: 20 / SUBM DATE: 09Mar65 / OTH REF: 007

HW  
Card 2/2

L 44280-05 ENT(m)/EPF(c)/EWP(j) PC-4/Pr-4 RM

ACCESSION NR: AP5008002

S/0186/65/007/001/0014/0025

AUTHOR: Potapova, S. A.; Fomin, V. V.

TITLE: Distribution of n-dicresyl phosphate between aqueous solutions of nitric acid and various organic solvents

SOURCE: Radiokhimiya, v. 7, no. 1, 1965, 14-25

TOPIC TAGS: dicresyl phosphate, nitric acid, benzene, chloroform, carbon, tetra-chloride, distribution coefficient

ABSTRACT: This work presents data of cryoscopic investigations of aqueous and benzene solutions of *n*-dicresyl phosphate (*n*-DCP) and its distribution between aqueous solutions of nitric acid and benzene, chloroform and carbon tetrachloride. All studies on distribution were conducted with  $P^{32}$ -labeled *n*-DCP. Like dibutylphosphate *n*-DCP showed a great tendency to form dimers in the nonpolar solvents. The value of the dimerization constant of *n*-DCP in chloroform ( $K = 0.97 \cdot 10^4$ ) is close to that in benzene ( $K = 1.39 \cdot 10^4$ ) and is significantly less than the value in carbon tetrachloride ( $K = 5.27 \cdot 10^4$ ) or the *K* for dibutylphosphate in chloroform.

Card 1/2



L 44290-65

ACCESSION NR: AP5008002

The dissociation constant of *n*-DCP is equal to 0.34-0.40 when the ionic strength is 1 and it decreases with an increase of the ionic strength. Distribution coefficients were obtained for monomeric *n*-DCP molecules between organic solvents and aqueous solutions of a nitric acid-lithium nitrate mixture with an overall ionic strength equal to 1.3 and 5. Orig. art. has: 4 figures and 9 tables.

ASSOCIATION: none

SUBMITTED: 06Jan64

ENCL: 00

SUB CODE: OC, GC

NO REF SOV: 001

OTHER: 002

*Page*  
Card 2/2

L 44281-65 EWT(m)/EPF(c)/EWP(j) Pc-4/Pr-4 RM

ACCESSION NR: AF5008004

S/0185/65/007/001/0033/0039

AUTHOR: Fomin, V. V.; Rudenko, T. I.

TITLE: Properties of solutions of tributylphosphate in benzene, carbon tetrachloride and n-decane. I. Heats of mixing and changes in volumes during mixing of anhydrous tributylphosphate with benzene, carbon tetrachloride and n-decane.

SOURCE: Radiokhimiya, v. 7, no. 1, 1965, 33-39

TOPIC TAGS: tributylphosphate, benzene, carbon tetrachloride, n-decane, calorimetry

ABSTRACT: The authors have undertaken a systematic investigation of the properties of binary systems consisting of tributylphosphate and three of the more frequently employed solvents--benzene, carbon tetrachloride and n-decane. The main purpose of the investigation was to determine the extent of the deviation of each system from an ideal system. Heat of mixing for different concentrations of the components was determined by means of a microcalorimeter (shown in fig. 1 of the Enclosure) at 25°C. It was found in the tributylphosphate-benzene and tributylphosphate-carbon tetrachloride systems that heat is liberated ( $\Delta H < 0$ ) and the volume decreases while in the tributylphosphate-n-decane system heat is absorbed and the volume increases.

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L 44281-65

ACCESSION NR: AP5008004

It is concluded that tributylphosphate solutions in these three solvents cannot be viewed as ordinary solutions. The methods of investigation which were employed do not completely reveal the nature of the interactions in the systems considered, thus the results obtained represent only the first stage of the investigation of these systems. Orig. art. has: 5 figures and 7 tables.

ASSOCIATION: none

SUBMITTED: 17Feb64

ENCL: 01

SUB CODE: 00, 00

NO REF SOV: 008

OTHER: 004

Card 2/3

L 44804-65

ACCESSION NR: AP5011803

UR/0186/65/007/002/0223/0232

AUTHOR: Fomin, V.V.

TITLE: Cation exchange on vermiculite at high pressure and temperature

SOURCE: Radiokhimiya, V. 7, no. 2, 1965, 228-232

TOPIC TAGS: cation exchanger, ion exchange column, vermiculite, ionic radius, absorption capacity

ABSTRACT: Ion exchange on vermiculite was studied under standard conditions, and it was found that only magnesium and calcium ions are replaced by other ions, such as alkali metal ions, in the case of which the adsorbing capacity increases with the ionic radius (from potassium to cesium). Experiments were also carried out in an autoclave at 230C and 30 atm, using water and  $\text{CaCl}_2$  and  $\text{MgSO}_4$  solutions. Under these conditions, depending upon the nature of the displacing cations, two different cation exchange reactions can take place; one of them, the displacement of iron ions by magnesium, does not occur at room temperature. The ability of part of the iron ions to be exchanged for magnesium ions is explained by structural considerations. It is postulated that the oxidation of ferrous ions to ferric ions in the course of vermiculitization not only caused

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L 44804-65

ACCESSION NR: AP5011803

a loss of part of the alkali metals, but also changed the arrangement of some magnesium ions; this change caused the latter to acquire a capacity for exchange. Orig. art. has: 6 tables.

ASSOCIATION: none

SUBMITTED: 01 Jun 64

ENCL: 00

SUB CODE: IC, MT

NO REF SOV: 010

OTHER: 008

mcb  
Card 2/2

MORGUNOV, A.F.; FOMIN, V.V.

Hydration and solvation of ferric chloride during extraction  
by ethers and ketones. Zhur. neorg. khim. 11 no.1:226-227  
Ja '66. (MIRA 19:1)

1. Moskovskiy khimiko-tekhnologicheskii institut imeni D.I.  
Mendeleeva. Submitted June 23, 1965.

ACC NR: AM6026751 (N)

Monograph

UR/

Fomin, Viktor Vasil'yevich

Hydroerosion of metals (Gidroeroziya metallov) Moscow, Izd-vo "Mashinostroyeniye," 1966. 290 p. illus., biblio., tables. 4000 copies printed.

TOPIC TAGS: hydroerosion, <sup>corrosion</sup> ~~hydroerosion~~ resistance, metal <sup>corrosion</sup> ~~hydroerosion~~, ~~metal hydroerosion resistance~~, ~~alloy hydroerosion~~ metal oxidation

PURPOSE AND COVERAGE: This book, which summarizes the result of studies conducted at the Murmansk Higher Naval School, is intended for design and production engineers, and for research workers studying the resistance of metals and alloys to hydroerosion. The author discusses hydroerosion in metals and alloys and methods of increasing the contact strength and service life of machine parts operating at high speed in liquid media. The effect of metal and alloy structure on their erosion resistance is shown, and the effect of a variety of factors on the process of metal erosion are analyzed. The mechanism and general law governing this type of deterioration in metals, the principles governing the proper selection of construction materials, and methods of improving the erosion resistance of metal parts reviewed. The book contains a considerable amount of

Cord 1/2

UDC: 620.193.19

ACC NR: AM6026751

experimental data which are said to be of great practical significance. There are 129 references, 96 of which are Soviet.

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SUB CODE: 11/ SUBM DATE: 23Feb66/ ORIG REF: 096/ OTH REF: 033

Card 2/2



POMIN, P. V.

Profile of an abrasive worm for grinding gear cutters.  
Stan. 1 instr. 36 no. 7s27-29 Cl '65. (MIRA 18:8)

FOMIN, Ya.

On collective farms of the Nenets National Area. Sel'. stroi.  
13 no.10:6 '58. (MIRA 11:10)

1. Nachal'nik Nenetskogo okruzhnogo otдела po stroitel'stvu v  
kolkhozakh, Arkhangel'skoy oblasti.  
(Nenets National Area--Farm buildings)

FOMIN, Ya.

Device for the preliminary adjustment of brake shoes. Avt.transp. 4  
no.8:51 Ag '62. (MIRA 16:4)

(Motor vehicles—Brakes)

S/106/63/000/002/001/007  
A055/A126

AUTHORS: Levin, B.R., Pomlin, Ya.A.

TITLE: Energy spectra of group signals in multichannel pulse systems

PERIODICAL: Elektrosvyaz', no. 2, 1963, 3 - 10

TEXT: The theory of the energy spectra of random pulse processes with a determined cadence interval is applied to sequences of pulse groups. The pulses in the group can be of different kinds. The analysis is limited to pulse group processes where the statistical characteristics of pulse groups are independent of their number ( $n$ ) in the sequence, and the statistical characteristics of the "ensemble" of pulse groups depend only on their reciprocal position. Using the method evolved by one of them [Levin, Teoriya sluchaynykh protsessov i yeye primeneniye v radiotekhnike (Theory of random processes and its application in radio engineering), second edition, Sovetskoye Radio, 1960], the authors deduce a general expression (consisting of a continuous and a discrete part) for the energy spectrum  $F(\omega)$  of a random sequence of groups of pulses with a determined cadence interval. They use this expression for the determination of the energy

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Energy spectra of group signals in multichannel ....  
spectrum

S/106/63/000/002/001/007  
A055/i.126

$$P(\omega) = P_{\text{chan}}(\omega) + P_{\text{synchr}}(\omega) + P_{\text{chan} \times \text{synchr}}(\omega) \quad (8)$$

of the group signal in a synchronous multichannel system with time-separation of channels, under the assumption that the signal consists of  $m$  identical channel pulses ( $n^*1$  to  $n^*m$ ) and one synchronizing pulse ( $n^*0$ ), the analysis being limited to the case where all the channels have identical statistical and physical characteristics. The authors next deduce three separate formulae giving the group energy spectrum in multichannel systems with pulse-amplitude, pulse-time and pulse-duration modulation, respectively, account taken of both the useful and parasitic modulation of pulses. There are 3 figures.

SUBMITTED: August 29, 1962

Card 2/2

LEVIN, B.R.; POMIN, Y.A.

Dispersion of the time-modulation of coincidence pulses in presence  
of a strong signal. 'Elektrosviaz' 19 no.6:72-73 Je '65. (MIRA 18:6)

LEVIN, B.R.; FOMIN, Ya.A.

Approximate determination of the distribution function of the transient duration of the envelope sum of determined signal and normal stationary noise under the threshold level. Radiotekhnika 18 no.5:22-28 My '63. (MIRA 16:8)

1. Deystvitel'nyye chleny Nauchno-tekhnicheskogo obshchestva radiotekhniki i elektrosvyazi imeni Popova.  
(Information theory)

ACCESSION NR: AP4014671

S/0108/64/019/001/0013/0017

AUTHOR: Levin, B. R. (Active member); Fomin, Ya. A. (Active member)

TITLE: Distribution of duration of peaks of the sinusoidal-signal-plus-normal-noise envelope over the threshold level

SOURCE: Radiotekhnika, v. 19, no. 1, 1964, 13-17

TOPIC TAGS: communication theory, signal plus noise envelope, normal stationary noise, peak duration distribution

ABSTRACT: This is a continuation of a previous work (Radiotekhnika, v. 18, no. 5, 1963) based on S. O. Rice's findings (BSTJ, v. 37, no. 3, 1958). The unknown probability density and integral function of peak-duration distribution are represented analytically by an approximation method which involves these considerations: (1) In the region of short-duration peaks, the distribution function can be evaluated with sufficient accuracy by its first approximation;

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ACCESSION NR: AP4014671

(2) In the long-duration region, the function decreases exponentially; (3) The area under the distribution curve is equal to 1; (4) The first moment of the probability density is equal to a known value of the mean peak duration. Approximation formulas are presented. A "satisfactory agreement" is claimed between the data estimated by the above method and that experimentally obtained by V. I. Tikhonov (UFN, v. 78, no. 3, 1962). Orig. art. has: 3 figures and 12 formulas.

ASSOCIATION: Nauchno-tekhnicheskoye obshchestvo radiotekhniki i elektrosvyazi (Scientific and Technical Society of Radio Engineering and Electrocommunication)

SUBMITTED: 18Feb63

DATE ACQ: 07Feb64

ENCL: 00

SUB CODE: CO

NO REF SOV: 003

OTHER: 001

Card 1 2/2

LEVIN, B.R.; FOMIN, Ya.A.

Use of time quantification of a random process in determining  
the duration of the distribution of its overshoots. Radio-  
tekhnika 20 no.10s1-8 O '65. (MIRA 18:11)

1. Deystvitel'nyye chleny Nauchno-tekhnicheskogo obshchestva  
radiotekhniki i elektrosvyazi.

ACC NR: AT6022365

SOURCE CODE: UR/0000/66/000/000/0021/0029

AUTHOR: Levin, B. R.; Fomin, Ya. A.

ORG: none

TITLE: Using time quantization for determining the distribution of spike durations in the normal-noise envelope

SOURCE: Vsesoyuznaya nauchnaya sessiya, posvyashchennaya Dnyu radio. 22d, 1966. Sektsiya teorii informatsii. Doklady. Moscow, 1966, 21-29

TOPIC TAGS: signal noise separation, noise calculation

ABSTRACT: S. O. Rice (BSTJ, 1958, v. 37, no. 3) and other researchers solved the problem formulated in the title for the case of a high threshold and distribution of the spikes over it and the case of a low threshold and distribution of intervals between the spikes. The present article analyzes the spike distribution for any

Card 1/2

ACC NR: AT6022365

threshold level. The time-quantization method is based on replacing the initial continuous process with a  $\vee$ -connected random sequence whose probabilistic characteristics are taken as approximate probabilistic characteristics of the initial process. In the article, formulas are derived for independent and singly-connected approximations to the spike-duration distribution, the between-spikes interval distribution, and the average duration and dispersion of spikes and intervals. The use of formulas is illustrated by an example involving a narrow-band stationary normal process with a correlation coefficient expressed as a Gaussian curve. Good agreement between the theoretical stepwise distribution and experimental points obtained by a Soviet researcher is noted. Orig. art. has: 2 figures and 19 formulas.

SUB CODE: 17, 09 / SUBM DATE: 28Apr66 / ORIG REF: 007 / OTH REF: 002

Card 2/2

1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCESSES AND PROPERTIES INDEX																			
<p>Clarification of circulating waters used in washing coal by physicochemical means. Ya. I. Pomin. <i>Ugol</i> 1933. No. 118, 95-100.—The coal and sludge-water carried off by circulation water can be pptd. to some extent with <math>\text{Fe}_2\text{O}_3</math> or <math>\text{Ca}(\text{OH})_2</math>, the former being more efficient. However, the stream of the treated water must be slow to permit a proper sedimentation. The Dorr thickeners having the water overflowing the rims are best. The gaps are described in great detail. A. A. H.</p>																			
<p>ASB-11A METALLURGICAL LITERATURE CLASSIFICATION</p>																			

1ST AND 2ND ORDERS																										3RD AND 4TH ORDERS																									
PROCESSING AND PROPERTIES INDEX																																																			
<div style="display: flex; justify-content: space-between;"> <div style="width: 10%;"> <p>CA</p> </div> <div style="width: 80%; text-align: center;"> <p>The removal of sulfur pyrites from wastes of Donbas coal. Ya. I. Roulin. <i>J. Chem. Ind. (U. S. S. R.)</i> 15, No. 11, 25-30 (1938). — Pyrites can be sepd. by sifting and flotation.</p> <p>H. M. Leicester</p> </div> <div style="width: 10%; text-align: right;"> <p>21</p> </div> </div>																																																			
<div style="display: flex; justify-content: space-between;"> <div style="width: 10%;"> <p>COMMON ELEMENTS</p> </div> <div style="width: 80%; text-align: center;"> <p>ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION</p> </div> <div style="width: 10%; text-align: right;"> <p>8-2</p> </div> </div>																																																			
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(3)

CENTRIFUGES FOR THE REMOVAL OF MOISTURE FROM COAL FINES.  
 Ya. I. Fomin. (Koks i Khimiya, 1939, No. 6, pp. 3-7). (In Russian). A survey is made of the operating characteristics and efficiencies of both horizontal and vertical centrifuges including the Simplex, Hamborn, Carpenter and Wendell types. While the Carpenter centrifuge is regarded as preferable owing to its simple construction, efficiency, low wear of screens and low running speeds, it is nevertheless concluded that none of the types is capable of reducing the moisture content of washed coal below 4-6%, which is the maximum permissible in order to prevent the freezing together of the Donets coking coals.

FOMIN, Ya.I., gornyy inzh; LAKOTA, B.M., gornyy inzh; GRAZHDANTSEV, I.I.,  
gornyy inzh; KUROVA, M.D., gornyy inzh.

Manganese ore dressing in heavy suspensions and flotation  
in industrial conditions. Gor.shur. no.11:32-44 N '48.

(Manganese ores) (Ore dressing)

(MIRA 11:11)



1ST AND 2ND ORDERS										PROCESSES AND PROPERTIES INDEX									
<p>778. DETERMINATION OF ENRICHABILITY OF COAL. Fomin, Ya. I. (Ugol (Coal), July 1950, vol. 25, 27-32).</p> <p>Derives a formula for determination of maximum coefficient of enrichability of coal, that is, its ability to be separated into low ash organic and high ash mineral parts by heavy liquid fractionation. Enrichability diagrams are presented, and their use for determination of optimum conditions of enrichment is explained.</p>																			
A 20-56.6 METALLURGICAL LITERATURE CLASSIFICATION										FROM SOURCE									
1ST ORDER										2ND ORDER									
1ST ORDER										2ND ORDER									

1. FOMIN, Ya. I.
2. USSR (600)
4. Coal - Donets Basin
7. Remarks on Eng. Fomenko's article "Classification of Donets coals according to their suitability for concentration." Reviewed by Ya. I. Fomin. Ugol' 27 no.10, 1952

9. Monthly List of Russian Accessions, Library of Congress, January 1953. Unclassified.

Enriching manganese slurries. Va. I. Bogin and E. S. Bogdanova. *Gornyi Zhur.* 1953, No. 3, 32-3; *Referat. Zhur., Khim.* 1953, Abstr. No. 60020. — During the enriching of Mn-ores, up to 30% of the Mn is lost in the slimes. Several Mn slimes are investigated searching for more convenient enriching methods. The samples are subjected to chem., mineralogical, granulometric, and gravitation analyses, and also to enrichment by gravitational, electromagnetic and flotation methods separately and in combinations. Recommended reagents are: oxidized kerosine, sulfate soap, and soda. In the basic flotation the liquid:solids = 2:1. Duration of the basic flotation is 20 min., the cleanup 5 to 10 min. The authors cite 3 recommended flotation schemes. N. Vasiliev

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1-4E2C

FOMIN, Ya.I., kandidat tekhnicheskikh nauk

The performance of a jig. Gor.zhur. no.7:57-60 JI '55. (MIRA 8:8)  
(Ore dressing)